wherein the phase shift keying provides periodically-spaced symbols which represent corresponding portions of the input digital signal in terms of differences between phases of the periodically-spaced symbols; and

wherein the at least 4-signal-point modulation assigns logic states of the input digital signal to respective signal points for a first symbol in response to a signal point used by a second symbol of the phase shift keying which precedes the first symbol.

3. (Amended) A method as recited in claim 1, wherein the phase shift keying is quadranture phase shift keying.

5. (Amended) A method as recited in claim 1, wherein the at least 4-signal-point modulation is at least 4 quadature amplitude modulation.

13. (Amended) A method as recited in claim 1, wherein a maximum of amplitudes corresponding to signal points of the at least 4-signal-point modulation in an I-Q plane is equal to an amplitude of a signal point of the phase shift keying in the I-Q plane.

33. (Amended) A transmission apparatus comprising:

first means for regularly subjecting an input digital signal to first modulation and second modulation to convert the input digital signal into a pair of a baseband I signal and a baseband Q signal, the first modulation and the second modulation being different from each other, the first modulation being at least 8-signal-point modulation, the second modulation being phase shift keying; and

second means for outputting the pair of the baseband I signal and the baseband Q signal.

Kindly add new claims 36-73 as follows

36. (New) A method as recited in claim 1, wherein the symbols provided by the phase shift keying comprise a pilot symbol for estimating an amplitude distortion amount and a frequency offset amount.

37. (New) A transmission apparatus as recited in claim 33, wherein the symbols provided by the phase shift keying comprise a pilot symbol for estimating at least one of (1) a transmission path distortion and (2) a frequency offset.

38. (New) A modulation method comprising:

generating a first multi-value modulation signal having multi-value symbols with a first multi-value modulation system;

generating a second modulation signal containing data and a pilot symbol estimating at least one of (1) a channel distortion and (2) a frequency offset for demodulating said multi-value modulation signal; and

inserting said second modulation signal containing data and a pilot symbol as a pilot signal into said multi-value modulation signal.

39. (New) A modulation method as recited in claim 38, further comprising deriving at least one of (1) channel distortion and (2) a frequency offset for a receiver from the pilot signal.

40. (New) A modulation method as recited in claim 38 or 39. wherein differential encoding is done between symbols of the second modulation signal.

41. (New) A modulation method as recited in one of claims 38 to 40, wherein an Information series of signal points of the first modulation signal is arranged while an regularly spaced signal point of the second modulation signal is used as a reference.

42. (New) A modulation method as recited in one of claims 38 to 41, wherein the second modulation signal is phase shift keying (PSK) modulation.

43. (New) A modulation method as recited in claim 42, wherein the second modulation signal is binary phase shift keying (BPSK) modulation.

44. (New) A modulation method as recited in claim 42, wherein the second modulation signal is quadrature phase shift keying (QPSK) modulation.

45. (New) A modulation method as recited in one of claims 38 to 41, wherein the first modulation signal is quadrature phase shift keying (QPSK) modulation.

46. (New) A modulation method as recited in one of claims 38 to 41, wherein the first modulation signal is at least 8-value modulation.

47. (New) A modulation method as recited in claim 46, wherein the first modulation signal is at least 8-value quadrature amplitude modulation (QAM).

48. (New) A modulation method as recited in one of claims 38 to 41, wherein the first modulation signal is 16QAM and the second modulation signal is PSK modulation, and a maximum signal point amplitude of the second modulation system is equal to 0.9 to 1.5 times a maximum signal point amplitude of the first modulation signal.

49. (New) A transmission apparatus comprising a first multi-value modulation system for subjecting an input digital signal to first modulation and outputting a quadrature baseband signal, a second modulation system producing a second modulation signal as a pilot signal regularly inserted into the multi-value modulation system for subjecting the input digital signal to second modulation and outputting a quadrature baseband signal, wherein the pilot signal includes a pilot symbol for estimating a frequency offset and a channel distortion.

50. (New) A transmission apparatus as recited in claim 49, wherein amplitude and phase distortion amounts of a receiver are derived from the second modulation signal pilot signal.

Sub B10 51. (New) A transmission apparatus as recited in claim 49 or 50, wherein differential encoding is done between symbols of the second modulation system.

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52. (New) A transmission apparatus as recited in one of claims 49 to 51, wherein an information series of signal points of the first modulation system is arranged while a regularly spaced signal point of the second modulation system is used as a reference.

Sub B11 53. (New) A transmission apparatus as recited in one of claims 49 to 52, wherein the second modulation system is phase shift keying (PSK) modulation.

Sub C7 54. (New) A transmission apparatus as recited in claim 53, wherein the second modulation system is binary phase shift keying (BPSK) modulation.

55. (New) A transmission apparatus as recited in claim 53, wherein the second modulation system is quadrature phase shift keying (QPSK) modulation.

56. (New) A transmission apparatus as recited in one of claims 49 to 52, wherein the first modulation system is quadrature phase shift keying (QPSK) modulation.

57. (New) A transmission apparatus as recited in one of claims 49 to 52, wherein the first modulation system is at least 8-value modulation.

58. (New) A transmission apparatus as recited in claim 57, wherein the first modulation system is at least 8-value quadrature amplitude modulation (QAM).

59. (New) A transmission apparatus as recited in one of claims 49 to 52, wherein the first modulation system is 16QAM and the second modulation system is PSK modulation, and a maximum signal point amplitude of the second modulation system is equal to 0.9 to 1.5 times a a maximum signal point amplitude of the first modulation system.

60. (New) A receiving apparatus for receiving a modulation signal of a first multi-value modulation system, and a modulation signal of a second modulation system which is regularly inserted into the multi-value modulation system, the apparatus comprising:

an estimating portion for extracting a signal estimating a channel distortion of the second modulation system from a quadrature baseband signal of the second modulation system; and

a detecting portion for modulating the first modulation system from the quadrature baseband signal and the transmission path distortion estimation signal, and for outputting data.

61. (New) A receiving apparatus for receiving a modulation signal of a multi-value modulation system of a first modulation system, and a modulation signal of a second modulation system which is regularly inserted into the signal of the multi-value modulation system, the apparatus comprising:

a frequency offset estimating portion for extracting a signal of the second modulation system from a quadrature baseband signal, and for outputting a frequency offset estimation signal; and

a detecting portion for modulating the first modulation system from the quadrature baseband signal with the frequency offset estimation signal.

62. (New) A receiving apparatus for receiving a first modulation signal of a multi-value modulation system, and a second modulation signal of a second modulation system which is regularly inserted into the first multi-value modulation signal, the apparatus comprising:

a channel distortion estimating portion for extracting a signal of the second modulation system of a received quadrature baseband signal of said first and second signals, for estimating a channel distortion, and for outputting a channel distortion estimation signal;

a frequency offset estimating portion for estimating a frequency offset from said extracted signal of the second modulation system, and for outputting a frequency offset estimation signal; and

a detecting portion for modulating the first modulation system signal from the quadrature baseband signal, the channel distortion estimation signal, and the frequency offset estimation signal, and for outputting data.

63. (New) A receiving apparatus for receiving a first modulation signal of a multi-value modulation system, and a second modulation signal of a second modulation system which is regularly inserted into the first multi-value modulation signal, the apparatus comprising:

a demodulating portion for extracting a signal of the second modulation system from a quadrature baseband signal of said first and second modulation signals, and for outputting corresponding data;

a distortion estimating portion for extracting a signal of the second modulation signal channel of the quadrature baseband signal, for estimating a channel distortion, and for outputting a channel distortion estimation signal; and

a detecting portion for demodulating the first modulation signal from the quadrature baseband signal, and the channel distortion for outputting data of the first modulation signal.

64. (New) A receiving apparatus for receiving a first modulation signal of a multi-value modulation system, and a second modulation signal of a second modulation system regularly inserted into the first modulation signal, comprising:

a demodulating portion for extracting said signal of the second modulation system from a quadrature baseband signal of said first and second modulation signals;

a frequency offset estimating portion for extracting a signal of the second modulation signal of the quadrature baseband signal, for estimating a frequency offset, and for outputting a frequency offset estimation signal; and

a detecting portion for modulating the first modulation signal from the quadrature baseband signal and the frequency offset estimation signal, and outputting data.

65. (New) A receiving apparatus for receiving a first modulation signal of a multi-value modulation system, and a second modulation signal of a second modulation system regularly inserted into the first modulation signal of the multi-value modulation system, comprising:

a demodulating portion for extracting a signal of the second modulation signal from a quadrature baseband signal of said first and second signals for outputting data;

a channel distortion estimating portion for extracting a signal of the second modulation signal of the quadrature baseband signal for estimating a channel distortion, and for outputting a channel distortion estimation signal;

a frequency offset estimating portion for extracting a signal of the second modulation signal of the quadrature baseband signal, for estimating a frequency offset, and for outputting a frequency offset estimation signal; and

a detecting portion for modulating the first modulation signal of the quadrature baseband signal, the channel distortion estimation signal, and the frequency offset estimation signal, and outputting data.

66. (New) A receiving apparatus as recited in one of claims 63, 64 or 65, wherein a detection system for the second modulation signal is delay detection.

67. (New) A receiving apparatus as recited in one of claims 63, 64, 65 or 66, wherein a detecting portion for the first modulation system is quasi synchronous detection.

68. (New) A receiving apparatus as recited in one of claims 63, 64, 65, 66 or 67, wherein the second modulation system is phase shift keying (PSK) modulation.

69. (New) A receiving apparatus as recited in claim 68, wherein the second modulation system is binary phase shift keying (BPSK) modulation.

70. (New) A receiving apparatus as recited in claim 68, wherein the second modulation system is quadrature phase shift keying (QPSK) modulation.

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71. (New) A receiving apparatus as recited in one of claims 63, 64, 65, 66 or 67, wherein the first modulation system is quadrature phase shift keying (QPSK) modulation.

72. (New) A receiving apparatus as recited in one of claims 63, 64, 65, 66 or 67, wherein the first modulation system is at least 8-value modulation.

73. (New) A receiving apparatus as recited in claim 72, wherein the first modulation system is at least 8-value quadrature amplitude modulation (QAM).

REMARKS

Claims 1, 3-13, 33, 36-73 are pending in the application. Favorable reconsideration is requested.

The acknowledgment of Applicants claim for priority is noted. However, the required certified copy of the priority documents was forwarded on February 18, 1999. (see attached postcard receipt and transmittal document) Copies of the priority documents are enclosed with this Response.